Complete Summary

GUIDELINE TITLE

Acute scrotum in children. In: Guidelines on paediatric urology.

BIBLIOGRAPHIC SOURCE(S)

Acute scrotum in children. In: Tekgul S, Riedmiller H, Gerharz E, Hoebeke P, Kocvara R, Nijman R, Radmayr C, Stein R. Guidelines on paediatric urology. Arnhem, The Netherlands: European Association of Urology, European Society for Paediatric Urology; 2008 Mar. p. 13-9. [59 references]

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Acute scrotum due to torsion of the testis, torsion of the appendix testis, or epididymitis

GUIDELINE CATEGORY

Diagnosis
Management
Treatment

CLINICAL SPECIALTY

Emergency Medicine
Pediatrics
Surgery
Urology

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

- To outline a practical and preliminary approach to paediatric urological problems
- To increase the quality of care for children with urological problems

TARGET POPULATION

Children and adolescents with acute scrotal pain

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Assessment of signs and symptoms
    - Pain
    - Fever
    - Tenderness
    - "Blue dot" sign
2. Physical examination
3. Urine cultures and urinalysis
4. Imaging studies
    - Doppler ultrasound
    - High-resolution ultrasound
    - Scintigraphy
    - Dynamic contrast-enhanced subtraction magnetic resonance imaging (MRI)

Treatment

1. Conservative treatment (minimal physical activity, analgesia)
2. Antibiotics if infection is present
3. Manual detorsion
4. Surgical treatment
    - Semi-elective exploration
    - Orchiopexy
    - Orchiectomy
    - Fixation of the contralateral testis

MAJOR OUTCOMES CONSIDERED

- Sensitivity and specificity of diagnostic tests

- Rate of salvage of testis
- Rate of preservation of fertility
- Sperm quality
- Recurrence after orchiopexy

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guidelines were based on current literature following a systematic review using MEDLINE.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

1a Evidence obtained from meta-analysis of randomized trials

1b Evidence obtained from at least one randomized trial

2a Evidence obtained from at least one well-designed controlled study without randomization

2b Evidence obtained from at least one other type of well-designed quasi-experimental study

3 Evidence obtained from well-designed non-experimental studies, such as comparative studies, correlation studies and case reports

4 Evidence obtained from expert committee reports or opinions or clinical experience of respected authorities

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Application of a structured analysis of the literature was not possible due to a lack of well-designed studies. Whenever possible, statements have been classified in terms of level of evidence and grade of recommendation. Due to the limited availability of large randomized controlled trials – influenced also by the fact that a considerable number of treatment options relate to surgical interventions on a large spectrum of different congenital problems – this document is therefore largely a consensus document.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

- The first step in the European Association of Urology (EAU) guidelines procedure is to define the main topic.
- The second step is to establish a working group. The working groups comprise about 4-8 members, from several countries. Most of the working group members are academic urologists with a special interest in the topic. In general, general practitioners or patient representatives are not part of the working groups. A chairman leads each group. A collaborative working group consisting of members representing the European Society for Paediatric Urology (ESPU) and the EAU has gathered in an effort to produce the current update of the paediatric urology guidelines.
- The third step is to collect and evaluate the underlying evidence from the published literature.
- The fourth step is to structure and present the information. The strength of the recommendation is clearly marked in three grades (A-C), depending on the evidence source upon which the recommendation is based. Every possible effort is made to make the linkage between the level of evidence and grade of recommendation as transparent as possible.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grades of Recommendation

A. Based on clinical studies of good quality and consistency addressing the specific recommendations and including at least one randomized trial
B. Based on well-conducted clinical studies, but without randomized clinical studies
C. Made despite the absence of directly applicable clinical studies of good quality

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

There is no formal external review prior to publication.

The Appraisal of Guidelines for Research and Evaluation (AGREE) instrument was used to analyse and assess a range of specific attributes contributing to the validity of a specific clinical guideline.

The AGREE instrument, to be used by two to four appraisers, was developed by the AGREE collaboration (www.agreecollaboration.org) using referenced sources for the evaluation of specific guidelines. (See the "Availability of Companion Documents" field for further methodology information).

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Levels of evidence (**1a-4**) and grades of recommendation (**A-C**) are defined at the end of the "Major Recommendations" field.

Diagnosis

Patients usually present with scrotal pain. The duration of symptoms is shorter in testicular torsion (69% present within 12 hours) compared to torsion of the appendix testes (62%) and acute epididymitis (31%).

In the early phase, location of the pain can lead to the diagnosis. Patients with acute epididymitis experience a tender epididymitis, while patients with testicular torsion are more likely to have a tender testicle and patients with torsion of the appendix testis feel isolated tenderness of the superior pole of the testis.

An abnormal position of the testis was more frequent in testicular torsion than in patients with epididymitis. Looking for the absence of the cremasteric reflex is a simple method with a sensitivity of 100% and specificity of 66% for the presence of testicular torsion (**Level of evidence: 3; Grade of recommendation: C**).

Fever occurs often in epididymitis (11-19%). The classical sign of a 'blue dot' was found only in 10-23% patients with torsion of the appendix testis.

In many cases, it is not easy to determine the cause of acute scrotum based on history and physical examination alone.

A positive urine culture is only found in a few patients with epididymitis. It should be remembered that a normal urinalysis does not exclude epididymitis. Similarly, an abnormal urinalysis does not exclude testicular torsion.

Doppler ultrasound is useful to evaluate an acute scrotum, with a sensitivity of 63.6-100% and a specificity of 97-100%, and a positive predictive value of 100%

and negative predictive value 97.5% (**Level of evidence: 3; Grade of recommendation: C**). The use of Doppler ultrasound may reduce the number of patients with acute scrotum undergoing scrotal exploration, but it is operator-dependent and can be difficult to perform in prepubertal patients. It may also show a misleading arterial flow in the early phases of torsion and in partial or intermittent torsion: persistent arterial flow does not exclude testicular torsion. In a multicentre study of 208 boys with torsion of the testis, 24% patients had normal or increased testicular vascularization. Better results were reported using high-resolution ultrasonography (HRUS) for direct visualization of the spermatic cord twist with a sensitivity of 97.3% and a specificity of 99% (**Level of evidence: 2; Grade of recommendation: C**).

Scintigraphy and, more recently, dynamic contrast-enhanced subtraction magnetic resonance imaging (MRI) of the scrotum also provide a comparable sensitivity and specificity to ultrasound. These investigations may be used when diagnosis is less likely and if torsion of the testis still cannot be excluded from history and physical examination. This should be done without inordinate delays for emergent intervention.

The diagnosis of acute epididymitis in boys is mainly based on clinical judgement and adjunctive investigation. However, it should be remembered that findings of secondary inflammatory changes in the absence of evidence of an extra-testicular nodule by Doppler ultrasound might suggest an erroneous diagnosis of epididymitis in children with torsion of appendix testes.

Prepubertal boys with acute epididymitis have an incidence of underlying urogenital anomalies in 25-27.6%. Complete urological evaluation in all children with acute epididymitis is still debatable.

Treatment

Epididymitis

In prepubertal boys, the aetiology is usually unclear, with an underlying pathology in about 25%. A urine culture is usually negative, and unlike in older boys, a sexually transmitted disease is very rare.

Antibiotic treatment, although often started, is not indicated in most cases unless urinalysis and urine culture show a bacterial infection. Epididymitis is usually self-limiting and with supportive therapy (i.e., minimal physical activity and analgesics) heals without any sequelae (**Level of evidence: 3; Grade of recommendation: C**). However, bacterial epididymitis can be complicated by abscess or necrotic testis and surgical exploration is required.

Torsion of the appendix testis can be managed conservatively (**Level of evidence: 4; Grade of recommendation: C**). During 6 weeks' follow-up, clinically and with ultrasound, no testicular atrophy was revealed. Surgical exploration is done in equivocal cases and in patients with persistent pain.

Testicular Torsion

Manual detorsion of the testis is done without anaesthesia. It should initially be done by outwards rotation of the testis unless the pain increases or if there is obvious resistance. Success is defined as the immediate relief of all symptoms and normal findings at physical examination (**Level of evidence: 3; Grade of recommendation: C**). Doppler ultrasound may be used for guidance.

Bilateral orchiopexy is still required after successful detorsion. This should not be done as an elective procedure, but rather immediately following detorsion. One study reported residual torsion during exploration in 17 out of 53 patients, including 11 patients who had reported pain relief after manual detorsion.

Surgical Treatment

Testicular torsion is an urgent condition, which requires prompt surgical treatment. The two most important determinants of early salvage rate of the testis are the time between onset of symptoms and the detorsion and degree of twisting of the cord. Severe testicular atrophy occurred after torsion for as little as 4 hours when the turn was more than 360 degrees. In cases of incomplete torsion (180 degrees to 360 degrees), with symptom duration up to 12 hours, no atrophy was observed. However, an absent or severely atrophied testis was found in all cases of torsion of more than 360 degrees and symptom duration of more than 24 hours.

Early surgical intervention with detorsion (mean torsion time <13 hours) was found to preserve fertility. Urgent surgical exploration is mandatory in all cases of testicular torsion within 24 hours of the onset of symptoms.

In those patients with testicular torsion of more than 24 hours, semi-elective exploration is necessary (**Level of evidence: 3; Grade of recommendation: C**). Until now, there is still controversy to carry out detorsion and to preserve the ipsilateral testis, or to perform an orchiectomy, in order to preserve contralateral function and fertility after testicular torsion of long duration (>24 hours).

A recent study in humans found that sperm quality was preserved in both orchiectomy and orchiopexy groups in comparison to control normal men, although orchiectomy resulted in better sperm morphology.

During exploration, fixation of the contralateral testis is also performed. Recurrence after orchiopexy is rare (4.5%) and may occur several years after operation. There is no common recommendation about the preferred type of fixation and suture material; however, many urologists currently use a Dartos pouch orchiopexy.

External cooling before exploration and several medical treatments seem effective in reducing ischaemia-reperfusion injury and preserving the viability of the torsed testis and the contralateral testis.

Perinatal Torsion

Most cases are extravaginal torsion in contrast to the usual intravaginal torsion, which occurs during puberty.

Intrauterine torsion may present as:

- Patients with a testicular nubbin
- Patients with a small and hard testis
- Patients with a normal-sized and hard testis
- Patients with an acute scrotum

Torsion occurring in the postnatal period within the first month of life presents with signs of an acute scrotum. The clinical signs correlate well with surgical and histological findings and thus define the need and the urgency to explore the history. Doppler ultrasound can be an additional diagnosis tool. The sensitivity for diagnosis of torsion of the testis is high, though the specificity is unknown for neonates. Doppler ultrasound may also be used to exclude congenital testicular neoplasm. Neonates with acute scrotal signs as well as bilateral cases should be treated as surgical emergencies.

In cases of postnatal torsion, one study reported 40% of testes were salvaged with emergency exploration. The contralateral scrotum should also be explored because of the risk of asynchronous contralateral testicular torsion in as many as 33% of cases.

Definitions:

Levels of Evidence

1a Evidence obtained from meta-analysis of randomized trials

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CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for some of the recommendations (see "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate and timely diagnosis and treatment of acute scrotum in children

POTENTIAL HARMS

Ischaemia-reperfusion injury after surgical intervention

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

The purpose of these texts is not to be proscriptive in the way a clinician should treat a patient but rather to provide access to the best contemporaneous consensus view on the most appropriate management currently available. European Association of Urology (EAU) guidelines are not meant to be legal documents but are produced with the ultimate aim to help urologists with their day-to-day practice.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

The European Association of Urology (EAU) Guidelines long version (containing all 19 guidelines) is reprinted annually in one book. Each text is dated. This means that if the latest edition of the book is read, one will know that this is the most updated version available. The same text is also made available on a CD (with hyperlinks to PubMed for most references) and posted on the EAU websites Uroweb and Urosource (www.uroweb.org/professional-resources/guidelines/ & http://www.urosource.com/diseases/).

Condensed pocket versions, containing mainly flow-charts and summaries, are also printed annually. All these publications are distributed free of charge to all (more than 10,000) members of the Association. Abridged versions of the guidelines are published in European Urology as original papers. Furthermore, many important websites list links to the relevant EAU guidelines sections on the association websites and all, or individual, guidelines have been translated to some 15 languages.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Timeliness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Acute scrotum in children. In: Tekgul S, Riedmiller H, Gerharz E, Hoebeke P, Kocvara R, Nijman R, Radmayr C, Stein R. Guidelines on paediatric urology. Arnhem, The Netherlands: European Association of Urology, European Society for Paediatric Urology; 2008 Mar. p. 13-9. [59 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2008 Mar

GUIDELINE DEVELOPER(S)

European Association of Urology - Medical Specialty Society
European Society for Paediatric Urology - Medical Specialty Society

SOURCE(S) OF FUNDING

European Association of Urology

GUIDELINE COMMITTEE

Not stated

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Primary Authors: S. Tekgül; H. Riedmiller; E. Gerharz; P. Hoebeke; R. Kocvara; R. Nijman; Chr. Radmayr; R. Stein

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

All members of the working group submit a conflict of interest form. The information is kept on file in the European Association of Urology (EAU) Central Office database. This guidelines document was developed with the financial support of the EAU. No external sources of funding and support have been involved. The EAU is a non-profit organisation and funding is limited to administrative assistance, travel, and meeting expenses. No honoraria or other reimbursements have been provided.

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the European Association of Urology Web site.

Print copies: Available from the European Association of Urology, PO Box 30016, NL-6803, AA ARNHEM, The Netherlands.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- EAU guidelines office template. Arnhem, The Netherlands: European Association of Urology (EAU); 2007. 4 p.
- The European Association of Urology (EAU) guidelines methodology: a critical evaluation. Arnhem, The Netherlands: European Association of Urology (EAU); 18 p.

Print copies: Available from the European Association of Urology, PO Box 30016, NL-6803, AA ARNHEM, The Netherlands.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on November 14, 2008. The information was verified by the guideline developer on December 19, 2008.

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Date Modified: 1/19/2009